



**UNIVERSITI KUALA LUMPUR**  
**Malaysia France Institute**

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**FINAL EXAMINATION**  
**JANUARY 2010 SESSION**

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<b>SUBJECT CODE</b>	<b>:</b>	<b>FCB 30502</b>
<b>SUBJECT TITLE</b>	<b>:</b>	<b>APPLIED ACOUSTICS</b>
<b>LEVEL</b>	<b>:</b>	<b>BACHELOR</b>
<b>TIME / DURATION</b>	<b>:</b>	<b>3.00 PM – 6.00 PM</b> <b>( 3 HOURS )</b>
<b>DATE</b>	<b>:</b>	<b>30 April 2010</b>

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**INSTRUCTIONS TO CANDIDATES**

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1. Answer ALL questions in English.
2. Please write your answers on the answer booklet provided.
3. Answer should be written in blue or black ink except for sketching, graphic and illustration.
4. All documents authorized (open book examination).

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THERE ARE 4 PAGES OF QUESTIONS, EXCLUDING THIS PAGE.

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**INSTRUCTION: Answer ALL questions.**  
Please use the answer booklet provided.

### Question 1

Refer to figure Q1, it is known that the sound power level of the source is given as below:

Octave band centre freq	Hz	63	125	250	500	1000	2000	4000	8000
$L_w$	dB	90	102	107	108	110	98	92	90

Calculate at 250Hz, 500Hz and 1000 Hz only the sound pressure level at 75m from the source at the atmospheric temperature of 30°C, if a long brick wall 2m high is placed between the cooling tower and the observation point, at a distance 1.5m from the source.

As figure Q2, you are given with the Noise Reduction due to a Barrier.

(20 Marks)

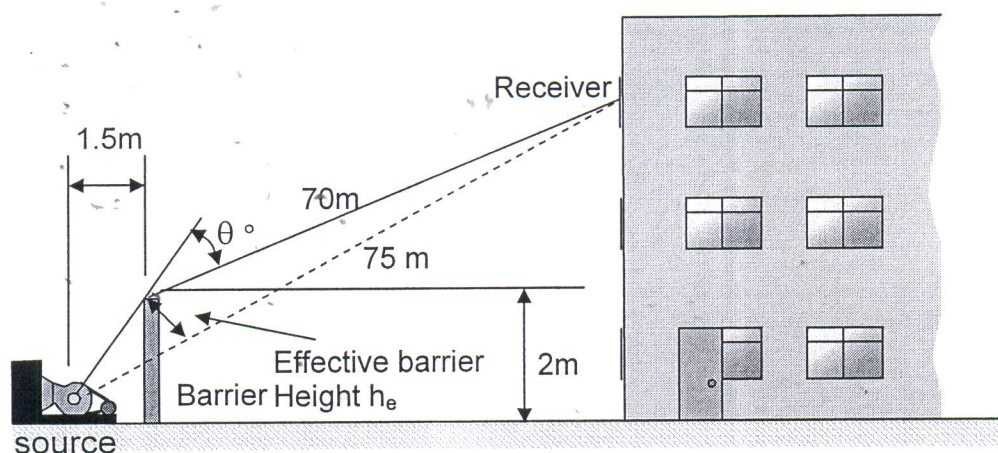
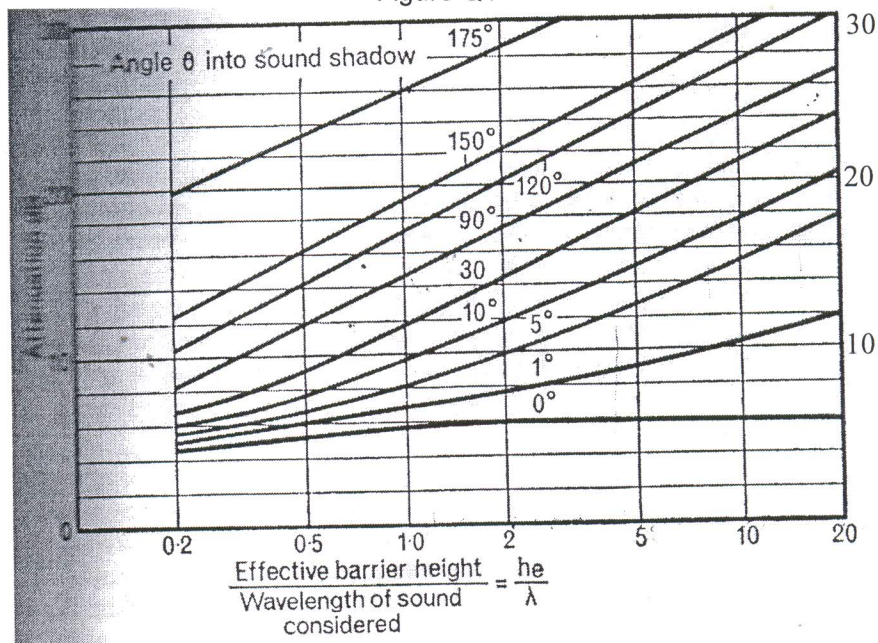


Figure Q1



Graph Q2

## Question 2

Refer to Table Q2(a) and (b) and Figure Q2. You are given the AHU specification as below Table Q2(a):

Table Q2(a): AHU specification

Octave band Freq	(Hz)	63	125	250	500	1000	2000	4000	8000
$L_w$ (dB)	dB	88	90	76	73	72	68	60	58

The room is constructed by concrete wall, suspended plasterboard ceiling and floor, windows and door and the absorption coefficient as below Table Q2.

The door size is 1m x 2m while the window size is 1m x 1m.

Table Q2(b): sound absorption specification:

Structure	Sound absorption coefficient, $\alpha$							
	63 Hz	125 Hz	250Hz	500Hz	1000Hz	2000Hz	4000Hz	8000 Hz
Fair-faced concrete wall	0.01	0.01	0.02	0.03	0.04	0.08	0.03	0.05
Windows, glass facade	0.04	0.05	0.08	0.05	0.05	0.08	0.02	0.03
Doors (timber)	0.06	0.05	0.10	0.08	0.08	0.08	0.08	0.08
Hard floor coverings	0.01	0.02	0.03	0.04	0.08	0.07	0.06	0.07
Suspended plasterboard ceiling	0.03	0.02	0.15	0.10	0.07	0.06	0.05	0.06

- a) Calculate the total  $L_p$  (dBA) for 1000Hz and 2000 Hz frequency band received by a receiver standing 1.5m away from the diffuser. The diffuser is suspended 1m from top of the ceiling.  
(20 Marks)
- b) By complying NR30 of the room, design the room by installing the minimum required silencer system.  
(10 Marks)



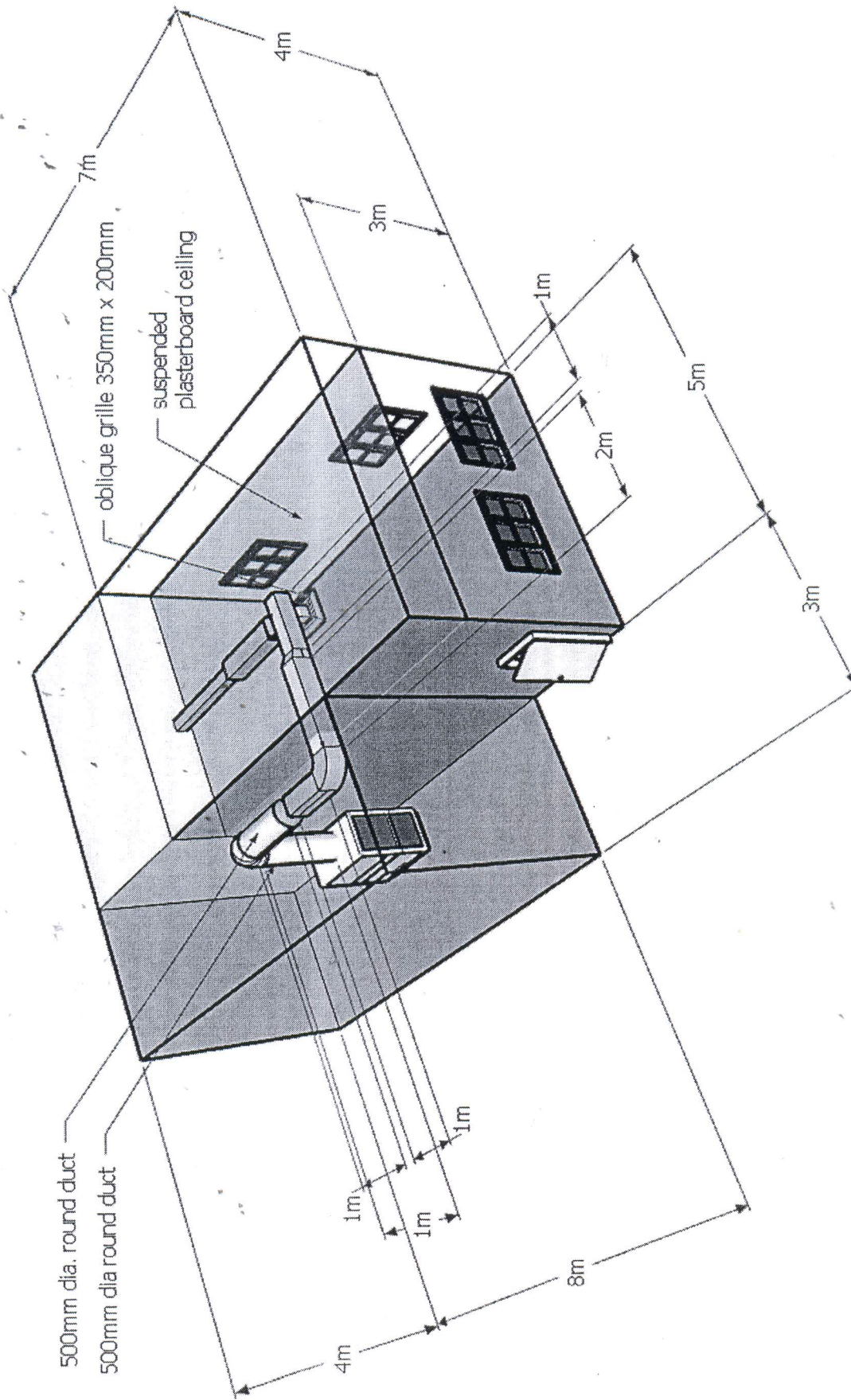


Figure Q2: Perspective view